

Summary Report
of
Sampling Activities
at the
Lenz Oil Service Site

EPA Region 5 Records Ctr.



206948

prepared for
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Project #06369

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WEHRAN
ENGINEERS
& SCIENTISTS

March 5, 1987

Mr. Steve Colantino
Illinois Environmental Protection Agency
2200 Churchill Road,
Springfield, Illinois 62706

RE: Summary Report of Sampling Activities at the
Lenz Oil Services Site
Lemont, Illinois
(WE Project No. 06369)

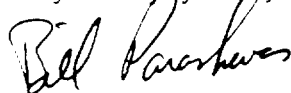
Dear Mr. Colantino,

It is our pleasure to submit the attached Summary Report of Sampling Activities at the Lenz Oil Services Site in accordance with our Project Outline Proposal Report (POPR).

The summary report includes the data from the drum, tank, and soil sampling programs as well as the hydrogeologic investigation and monitoring well installation. A site plan that shows the sampling locations, drum staging areas, tank locations, and other physical properties of the site is included. This is our final report and concludes our activities on this project.

If you have any questions or feel any aspect of this report requires clarification, please do not hesitate to contact us.

Very truly yours,



William G. Paraskevas
Branch Office Director

WGP/mc

Enc.

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1.0 SUMMARY OF ACTIVITIES

1.1 Introduction

From June 18 to July 30, 1986, Wehran Engineering, under contract with the Illinois Environmental Protection Agency (IEPA), conducted a site investigation at the Lenz Oil Services site near Lemont, Illinois. The primary purposes of this site investigation were to determine the types of waste materials present on site and to conduct a preliminary investigation into the contamination of the underlying soils and groundwater. The following sections comprise a summary of the activities that occurred during the course of this investigation.

1.2 Set-up and Tank Inventory

Prior to any sampling, a decontamination pad was constructed within the site boundaries at the easternmost entrance to the site. This area was used to decontaminate all vehicles and equipment that left the site and for the daily decontamination of the reusable safety and sampling equipment. A trailer was also brought on-site to serve as an office and as a storage facility for safety and sampling equipment.

Initially, a tank inventory was completed by walking through the site and noting the number of tanks and their locations. Each tank was labelled with an identifying number. These tank locations are shown on the accompanying site plan. Workers conducting this inventory wore Level C protective gear and monitored the ambient conditions with portable air monitoring equipment.

1.3 Drum Staging

A concrete block storage shed exists in the southernmost corner of the site. The northern section of this shed housed an unknown number of fifty-five gallon drums containing unknown materials. These drums were stacked two-high. Most of the drums were either punctured or rusted through and required an overpack to prevent further leakage of material onto the ground. As the drums were removed from the shed, they were labelled with an identification number. The leaking drums were placed in the overpacks using a forklift with a drum ring attachment. The overpacks were labelled with the same identification number as the drums that were placed in them.

The forklift was also used to relocate all of the drums and overpacked drums to one of three staging areas shown on the site plan. Two of these staging areas contain exclusively overpacked drums. Drum Staging Area #1 is one such site and is located at the south corner of the site between the storage shed and the concrete block garage. The second area for overpacked drums is Drum Staging Area #3 located in the western portion of the site between tanks T-19 and T-23. Drum Staging Area #2 was set-up for drums that did not require an overpack either because the drum was intact or empty. This area is located between the tank farm and Drum Staging Area #3. Intact drums from the storage shed and empty or intact drums from other various locations within the site were included in this area. A total of 197 drums were located and labelled.

1.4 Drum and Tank Sampling

1.4.1 Drum Sampling

Once the drum staging was completed, the sampling segment of the field investigative program began. The first task that was undertaken was the opening of all the drums. The workers involved in this phase of the work wore Level B protection, either self-contained breathing apparatus (SCBA) or air lines. The ambient environment around the drums was monitored with an HNU meter or an Organic Vapor Analyzer (OVA). These instruments were also used to monitor the airspace in each vessel.

There were two principle sampling devices used for the materials in the drums - coliwassas and trowels. The method of sampling for a particular drum was chosen based on the physical state of the waste material and the accessibility of the material through the top of the drum. Extremely viscous semifluids and solids were sampled with trowels when drum tops could be removed. Semifluids were sampled with coliwassas when drum lids could not be removed and the only available access to the material was through a bung hole in the top of the drum. Liquids were always sampled utilizing coliwassas.

Each sampling device was rinsed with acetone and then distilled water prior to sampling to prevent the introduction of foreign contaminants to the sample. The expended sampling device was disposed of in the drum that was sampled to prevent cross-contamination between drums. The only exception to this practice was the trowels used for taking composite samples as described below.

Semifluids with similar physical characteristics (i.e. color, texture, etc.) were sampled and combined as composite samples, with no more than four drum samples per composite sample. The same trowel was used to sample each drum in any one composite sample and then disposed of in the drum. There was no compositing of liquid samples. One sample was taken for each phase in drums that contained more than one layer. As each labelled sample jar was filled, it was sealed with evidence tape, initialled and dated, and placed in a cooler provided by the IEPA contract laboratory.

An estimate was made as to the depth of material contained in each drum. If a drum was empty a note was placed in the field book stating that fact. Upon completion of the sampling, each of the drums and each overpack were closed.

1.4.2 Tank Sampling

The tank sampling safety program was conducted in a manner similar to that of the drum sampling. That is, the tank opening process was conducted using Level B protection and the ambient conditions were monitored with an OVA. In addition to the OVA, the tanks were also monitored with an explosimeter/oxygen meter. This safety device sounded an alarm whenever the oxygen level dropped to 19% or less or when 25% of the Lower Explosive Limit (LEL) was reached. Because the explosimeter is calibrated for propane, a limit of 25% of the LEL was conservatively used as a warning level when monitoring atmospheres containing unknown vapors to allow for differences in instrument response to different compounds. The tanks were sampled by dipping a glass container into the material contained in the tanks and pouring what was collected into jars provided by the IEPA contract laboratory. The level of

the material in some of the tanks was such that it could not be reached by hand dipping, therefore an extension had to be added to the handle of the dipper. Prior to sampling, each dipper was rinsed with acetone and then distilled water to prevent the introduction of contaminants to the tanks. At the conclusion of sampling each tank, the dipper was disposed of in the tank to prevent cross-contamination between tank samples.

As with the drum samples, tank samples were also sealed with evidence tape, initialled and dated, and placed into a cooler provided by the IEPA contract laboratory.

1.4.3 Oxygen Deficient and/or Potentially Explosive Atmospheres

As noted in the previous section, an explosimeter/oxygen meter was utilized to provide a warning of oxygen deficient or potentially explosive atmospheres. There were several areas where the alarm sounded.

The first area was in the vicinity of tank T-23. Oxygen levels sometimes dropped to 19% in the breathing zone. The location where these readings were obtained is shown on the accompanying site plan view. The cause of these low oxygen levels was not determined.

The warning level on the explosimeter was exceeded in two areas. Near tank T-27, readings of 100% LEL were obtained, while at tank T-14, readings of 62% LEL were noted.

Due to restricted access to Tank T-17 - which was buried - the atmosphere inside that tank could not be surveyed. However, because of its location with respect to the gasoline pump on the site and an opening in the tank that was found beneath that pump, it is believed that the tank was used for gasoline storage and may contain some residual amount. If so, then a potential explosive atmosphere within the tank could exist.

1.5 Surface Soil Sampling

Six composite surface soil samples were taken for chemical analysis to aid in the determination of the extent of the contamination of the site. Four of these samples were taken in the vicinity of tanks. One sample was taken immediately north of the tank farm from zero to five inches below the surface. This sample location is shown as X101 on the site plan. A second sample, labelled X102 on the site plan, was taken immediately north of tank T-34 from zero to five inches below the ground surface. Both of these samples were oily and the head space in the glass, wide-mouthed jars had OVA readings of greater than 1000 parts per million (ppm). These readings were taken by opening the jar and inserting the OVA probe into the jar and then covering the jar opening with the lid to prevent dispersion by the wind of the contained vapors.

A third sample, X104, was taken from the inside of the berm surrounding tanks T-32 and T-33. The last of these four surface soil samples taken near tanks was X108, located immediately south of tank T-16. This sample was generally gravel coated with a dried oil.

One of the two remaining composite surface soil samples was taken from the cinder stockpile near the north fence adjacent to the former lagoon area as shown on the

site plan. This sample was labelled X103. The final surficial soil sample, X107, was taken from the soils underlying the area in the storage shed where the drums had been stacked. This sample was oily.

1.6 Subsurface Investigation

1.6.1 Magnetometer and Metal Detector

Another segment of the field investigation was the location of underground objects, such as piping systems or drums, using a magnetometer and a metal detector. The magnetometer that was used was a Geometrics; Model: G816. Several anomalies were located in the former lagoon area. These locations are shown on the site map and denoted with the prefix "PL". Although the exact dimensions of these objects could not be determined, it was determined that they were relatively small. PL-9 is an exception to the above statement. The anomaly in the soil detected at this point was larger than a typical fifty-five gallon drum. There was also a large object detected between Drum Staging Areas #2 and #3. The precise dimensions of these two larger subsurface objects was not determined.

1.6.2 Hand Augering

Fourteen borings were hand augered in the former lagoon area to evaluate conditions in the area affected by the lagoon. Two other borings were hand augered near tank T-18. These auger holes are denoted on the site plan by the prefix "A". OVA readings were taken at various depths in each auger hole. The following table shows the OVA readings for each boring at each depth:

Boring Number	Depth in inches of OVA readings in ppm					
	0"-2"	3"-5"	6"-8"	9"-11"	12"-14"	15"-18"
A-1	NR	NR	>1000	>1000	NR	>1000
A-2	0	NR	30-45	NR	NR	NR
A-3	0	3-5	10-20	45	NR	NR
A-4	1.8	2.2-3.2	NR	NR	NR	NR
A-5	2.8	3-5	35	100	NR	125
A-6	4.8	>1000	>1000	>1000	>1000	NR
A-7	5.7	10-20	750	NR	>1000	>1000
A-8	NR	NR	>1000	NR	NR	NR
A-9	NR	NR	NR	>1000	NR	NR
A-10	NR	NR	NR	>1000	NR	NR
A-11	NR	NR	NR	>1000	NR	NR
A-12	NR	NR	NR	>1000	NR	NR
A-13	NR	NR	NR	>1000	NR	NR
A-14	NR	NR	200	NR	NR	NR
A-17	NR	NR	>1000	NR	NR	NR
A-18	NR	NR	>1000	NR	NR	NR

NOTE: NR denotes no reading taken

1.6.3 Shallow Lagoon Borings

In addition to the hand-augered holes, ten shallow borings were augered in the lagoon area with the drill rig. These borings had a maximum depth of eight feet and are delineated on the site plan by the prefix "LB". These borings further aided in the determination of the extent of staining in the upper portion of the overburden.

Boring Number	Depths of Stained Zone (ft)	Depth of OVA Reading(s) (ft)	OVA Reading(s) (ppm)	Total Depth of Boring (ft)
LB-1	No Staining	0-2 2-4	400 100	4
LB-2	1-4	0-1	200	4
LB-3	1-6	0-1 1-6	>1000 >1000	6
LB-4	1.5-3	NR	NR	5
LB-5	No Staining	NA	>1000	6
LB-6	No Staining	NA	>1000	8
LB-7	3.5-6	NA	>1000	6
LB-8	No Staining	NA	>1000	6
LB-9	2'8"-3'8"	NA	>1000	6
LB-10	4-6	NR	NR	6

NOTES: 1) NR denotes no readings taken
2) NA denotes that the depth at which the OVA reading was taken was not recorded.

1.7 Hydrogeologic Investigation

1.7.1 Split Spoon Samples

The final phase of the field program was the hydrogeologic investigation. During this phase continuous split spoon samples were taken from the borings labelled with the prefix "SM" on the site map. The split spoons were taken for two reasons - to better define the hydrogeology of the site and to aid in the determination of the vertical limit of soil contamination. Contamination limits were checked visually by inspecting each spoon and noting whether or not the soil contained in the split spoon was obviously stained. The following table is a summary of the contaminated zones in the soil borings:

Soil Boring Number	Depth to Top of Contamination(ft)	Contaminated Zone Thickness(ft)	OVA Reading from boring(ppm)
SB-1	6	6	>1000
SB-2	2	10	>1000
SB-3	6	into bedrock	>1000
SB-4	7.5	4.5	>1000
SB-5	None	--	NR

Soil samples were also taken from each of these borings for chemical analysis. A chart on the site map shows the sample numbers given to each of these samples and the boring from which each was extracted. It should be noted that in boring SB-1, sample X111 was taken as the "worst case" situation with regard to staining. Sample X109 represents the same situation in boring SB-2. Samples X110 and X112 were taken below these worst case situations. Boring logs are contained in Appendix B.

Because these samples were for chemical analysis, the split spoons were cleaned before each use. The following procedure was used:

- * detergent rinse
- * hexane rinse
- * methanol rinse
- * distilled water rinse

1.7.2 Monitoring Wells

A total of eight stainless steel monitoring wells were to be installed on-site. Four deep wells were to be screened in the bedrock and four shallow wells were to be screened across the water table surface. However, only three wells were completed before the program was halted by the IEPA to begin preparations for surface clean-up.

Two wells, one shallow and one deep, were completed near tanks T-18 and T-23. These wells were labelled L105S and L105D. One other shallow well, L106S, was installed near the southern entrance to the site. Appendix C contains the construction logs for each of these wells.

A deep well was under construction near well L106S but was not completed on instructions from the IEPA. The boring for this well had been cored a depth of 16.5 feet and the 4-inch PVC casing grouted into place with a 5% bentonite grout to prevent introduction of contaminants in preparation for the actual installation of the well. This boring was left in a state so that the well could be completed should the IEPA desire and is protected by a steel casing to prevent damage.

The three completed wells consist of two-inch diameter, 316 stainless steel, flush threaded screens with 0.1-inch slot size. The screens are five feet long. The risers are two-inch, 316 stainless steel, flush threaded pipe. The sandpack consists of a silica sand from one foot below the screen to one foot above the screen. A one-foot thick bentonite seal was placed just above the sandpack. Two types of bentonite seals were used. Wells L105S and L105D had a bentonite powder in a heavy slurry placed by tremie pipe as a seal. This method was employed to insure that the seals were placed at the proper depths. Well L105D was a deep well and the seal needed to be placed at a depth of 24 feet. Well L105S was a shallow well that required a seal at only three feet, however, there was standing water above the depth of the seal. These two situations precipitated the need to tremie the bentonite slurry. The seal for well L106S was a one-foot layer of 1/4-inch bentonite pellets. This method could be utilized because of the shallow depth of the seal and the fact that it was above the water table. Both the bentonite slurry and bentonite pellets have the same sealing capacity. For all three wells, the remaining annular space was filled with a 5% bentonite grout. Each well was protected by a six-inch steel casing, with a locking cap, grouted around the well. The three completed wells were developed for four hours each by the air lift method.

1.7.3 Groundwater Sampling

The last segment of the hydrogeologic investigation was the groundwater sampling. This occurred on July 30, 1986. In all, twelve wells were sampled for volatile organics - seven existing State wells, two nearby residential wells, and the three new on-site wells. All groundwater samples were delivered to Aqualab, Inc. of Bartlett, Illinois.

Residential well samples were taken from garden hoses connected to taps off the discharge line for the wells. Prior to sampling, the water in each well was allowed to run for at least five minutes so as to adequately purge the wells. The monitoring wells were purged using a peristaltic pump. One of two criteria had to be met before each well was sampled. Either the specific conductance, temperature, and pH of the water being purged became stable, as determined by constant monitoring, or three well volumes were pumped, whichever occurred first. Because the parameters being tested for were volatile organics, these wells were sampled with a teflon bailer and a nylon rope. Between sample points the nylon rope was disposed of and replaced with a new length of rope, and the bailer and peristaltic pump hose were cleaned with the following procedure as outlined in Procedure 3 of the Wehran Technical Procedures Manual:

1. Hexane rinse
2. Distilled water rinse
3. Methanol rinse
4. Distilled water rinse.

The following table shows the correlation between groundwater sampling numbers and sampling locations:

<u>Sample Number</u>	<u>Location</u>
G101	Mason residence
G102	Williams Bait Shop
G103	L102D
G104	L102S
G105	Field Blank
G106	L104D
G107	L104L
G108	L101L
G109	L101D
G110	L101M
G111	Field Blank
G112	L105D
G113	L105S
G114	L106S

1.7.4 Site Security

During the hydrogeologic investigation, the locks on the access gate to the site and on the site trailer were broken, and the trailer was burglarized during the night of July 10. Among the items taken were:

- * respirators
- * respirator cartridges
- * 5-minute escape packs

- * air lines
- * generator
- * pressure washer
- * steam cleaner
- * typewriter

2.0 DESCRIPTION OF TANKS AND DRUMS

2.1 Introduction

During the initial portion of the site investigation of the Lenz Oil site, from June 18 to July 2, 1986, Wehran Engineering located and labelled 35 tanks and 197 drums. Most of these containers held materials of unknown composition. The following sections list the size, shape, and depth of the contents for each tank and the depth of the contents for each drum.

2.2 Tanks

The depth of the material in the tanks was measured by pushing a one-inch by two-inch board into the material, removing it, and measuring the length of the stained section. The following is a list of the tanks that contained material at the initiation of the project.

Cylindrical Tanks

Tank ID #	Diameter (ft)	Length (ft)	Depth of Contents (ft)	OVA Readings at openings (ppm)	Comments
T-5	8	21.5	1.2	300-400	Horizontal
T-6	8	24	6.5	10-15	Horizontal
T-7	7.5	32	4.6	30-40	Horizontal
T-8	7	16	2.7	20-25	Horizontal
T-9	8.5	21	7.4	300	Horizontal
T-10	10	30	3.6	1	Horizontal
T-11	7	NR	4.9	10	Horizontal, Underground
T-12	8.5	21	2.2	200-400	Horizontal
T-13	8	21.5	2.0	20-40	Horizontal
T-14	NR	NR	NR	NR	Horizontal
T-15	6.5	24	0.5	10-15	Horizontal
T-19	NR	NR	Trace	0	Tank Truck
T-20	NR	NR	Trace	0	Tank Truck
T-21	NR	NR	Trace	2	Tank Truck
T-22	NR	NR	0.5	8	Tank Truck
T-23	NR	NR	4.3	300	Horizontal
T-24	NR	NR	1.2	60	Horizontal
T-25	NR	NR	1.1	25	Horizontal
T-26	NR	NR	0.5	60	Horizontal
T-27	NR	NR	0.2	>1000	Horizontal
T-29	NR	NR	Trace	35-45	Tank Truck
T-31	7	20	1/3 Full	36	Vertical

Cylindrical Tanks Cont.

Tank ID #	Diameter (ft)	Length (ft)	Depth of Contents (ft)	OVA Readings at openings (ppm)	Comments
T-35	NR	NR	300 gal	>1000	300 gal tank

NOTE: NR denotes that the dimensions were not measured. See note 3 on site plan.

Rectangular Tanks

Tank ID #	Length (ft)	Width (ft)	Depth of Contents (ft)	OVA Readings at opening (ppm)	Comments
T-16	45	29	5.8	1-2	Underground
T-18	50	30	9.0	>1000	Underground
T-34	45	37.5	6.4	1.2	Underground

The following tanks were empty at the commencement of the project:

<u>Tank ID#</u>	<u>Comments</u>
T-1	Horizontal
T-2	Vertical
T-3	Tank Truck
T-4	Small water tank
T-28	Tank Truck
T-30	Tank Truck
T-32	Vertical
T-33	Vertical

The depth of material in the underground tank T-17 was not measured due to difficulty of access through the surface port. It appears that this tank contains, or contained gasoline because the port was found under a gasoline pump.

The information contained in the above tables is supplemented by the Tank Sample Data Sheets contained in Appendix D.

It should be noted that the IEPA hired an independent contractor to pump several thousand gallons of the contents of tank T-18 into nearby empty tank trucks to eliminate the surface release caused by T-18. These tank trucks included T-22 and T-28.

2.3 Drums

Appendix A contains a summary sheet for the drums that were found on site. The first column of this summary sheet, Drum ID#, lists the number that actually appears on the drums or on the overpack. The second column gives the condition of each drum. There were two basic entries for drum condition, OP and G. "OP" denotes the drum had to be overpacked and "G" means the drum was in good enough condition that there was no need for it to be overpacked.

Column 3 shows the physical state of the waste, either liquid, solid, or semi-fluid. Semifluid is a state where a substance is neither liquid nor solid. It is a substance that flows but is extremely viscous.

The height of waste was measured for almost every drum. This is shown in column 4. The following is a key to the symbols contained in this column:

F = Full
E = Empty
any fraction = approximate fraction of a full drum
NR = no reading

The fifth column was rarely used because waste depths of the 55-gallon drums were estimated. However, this column was used to estimate volumes of drums that were not of the standard 55-gallon variety.

The sixth column (OVA/HNU reading) notes any reading that was recorded using an Organic Vapor Analyzer (OVA) or a photoionization unit (HNU) when the drum was opened.

The specific conductivity and pH of the contents of the drums were not measured and, consequently, column 7 was not used. Column 8 lists the appearance of the samples that were taken from the drums.

The last column (comments) is probably the most important column because it lists the sample number for each drum. The following is a list that should "decode" the sample numbers:

X2 - followed by any two numbers denotes a sample taken from a drum in the series D1-D99
X2 - followed by the letters C or D then a number (e.g. X2C1 or X2D2) denotes a composite sample. There will be a least two drums per composite sample but no more than four
XD - followed by any two numbers also denotes a composite sample
X4 - followed by any two numbers denotes a sample taken from the series D100 to D197
X5 - followed by any two numbers denotes a duplicate sample taken from the same location as the other sample listed on the same line
T & B - denotes a drum that was phase layered and samples were taken from both the top (T) and bottom (B)
E - Empty

APPENDIX A

Drum Sampling Data Sheets

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86-7/1/86</u> CLIENT : <u>IEPR</u> WEATHER: _____ JOB No. : <u>06369</u> AIR TEMP: _____ SAMPLERS : <u>Kavanagh/Moss</u>						DRUM SAMPLING FIELD DATA SHEET		
DRUM ID #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	QVA/HNU READING (ppm)	PH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-1	OP	solid	NR		4-6		black tar	X201
D-2	OP	liquid	2"		2		thick black oil	X202
D-3	OP	solid	NR		0		thick black tar	X203
D-4	OP	semi fluid	NR		4		black thick sludge	X204
D-5	OP	solid	3/4		8		thick sticky black tar	X205
D-6	OP	semi fluid	F		4		black oil sludge ^{clear} _{finger}	X206
D-7	OP	solid	F		4		black sticky tar	X207
D-8	OP	liquid	7/8		3		brown liquid with oil	X208
D-9	G	liquid	1/10		71000		brown liquid	X209
D-10	OP	liquid	1/2		3		black oil & sludge	X210
D-11	OP	semi fluid	1/4		4		black sludge	X211
D-12	OP	solid	3/4		71000		brown solid	X212
D-13	OP	solid	NR		1-20		thick black tar	X213
D-14	OP	solid	1/4		4		black solid	X214
D-15	OP	semi fluid	F		1		black sludge	X215
D-16	OP	solid	1/4		1		brown/black thick tar	X216
D-17	OP	semi fluid	3/4		71000		black oil sludge	X217
D-18	OP	semi fluid	> 1/2		3-11		black thick sludge	X218
D-19	OP	liquid	F		2		black oil	X219
D-20	OP	semi fluid	7/8		1		black oil sludge	X220
D-21	OP	solid	F		4.5		black tar	X221
D-22	G	liquid	F		0		viscous black liquid	X222
D-23	OP	semi fluid	F		0		black oil & sludge	X223
D-24	G	liquid	F		9.5		black liquid	X224

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86 - 7/1/86</u> CLIENT : <u>IEPA</u> WEATHER: _____ JOB No. : <u>06369</u> AIR TEMP: _____ SAMPLERS : <u>Moss / Kerenagh</u>						DRUM SAMPLING FIELD DATA SHEET		
DRUM I.D. #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVAHNU READING (ppm)	PH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-25	G	semi fluid	F		4.5		black thick sludge	X225
D-26	OP	semi fluid	NR		7		black oil sludge	X226
D-27	OP	liquid	3/4		0		black oil	X227
D-28	OP	semi fluid	F		120-180		black sludge	X228
D-29	OP	semi fluid	3/4		2		black oil sludge	X229
D-30	G	semi fluid	F		0		black thick sludge	X230
D-31	OP	liquid	3/4		0		black oily liquid	X231
D-32	OP	liquid	3/4		NR		black oil	X232
D-33	OP	semi fluid	1/2		NR		black sludge	X233
D-34	OP	solid	NR		4		thick black tar	X234
D-35	OP	liquid	F		1		thick black oil	X235
D-36	G	semi fluid	F		5.4		black thick sludge	X236
D-37	OP	semi fluid	F		7		thick black sludge	X237
D-38	OP	solid	F		9.5		black tar	X238
D-39	OP	semi fluid	F		10-33		black sludge	X239
D-40	OP	solid	1/2		5.2		brown grease	X240
D-41	G	solid	F		7.5		brown grease	X241, X541
D-42	OP	semi fluid	F		5.2		brown/black sludge	X242
D-43	OP	solid	7/8		6.2		brown grease	X2C1
D-44	OP	solid	3/4		2.0		brown grease	X2C1
D-45	OP	solid	3/4		15		brown grease	X2C1
D-46	OP	solid	F		3-10		brown grease, clear liquid	X246T, X246S
D-47	OP	solid, liquid	NR		5		brown grease	X247
D-48	OP	solid	1/8		3.8		brown grease	X248

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86-7/1/86</u> CLIENT : <u>IEPA</u> WEATHER: _____ JOB No. : <u>06369</u> AIR TEMP: _____ SAMPLERS : <u>Karenagh / Moss</u>						DRUM SAMPLING FIELD DATA SHEET		
DRUM ID #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVA/HMU READING (ppm)	PH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-49	OP	semi fluid	F		5		black sludge	X249
D-50	OP	solid	F		3.5		tar	X251
D-51	OP	semi fluid	F		71000		metallic brown sludge	X251
D-52	OP	solid	F		2.0		brown grease	X252
D-53	OP	solid	3/4		10		regs & grease	X254
D-54	OP	solid	1/2		0		grease	X255
D-55	OP	semi fluid	1/2		150-200		black sludge	X256
D-56	OP	solid	3/4		2		grease	X254
D-57	OP	liquid & solids	1/2		1		oil & regs	X255
D-58	G	liquid	F		2		black liquid	X258, X558
D-59	G	liquid	7/8		0		black liquid	X259
D-60	OP	solid	3/4		0		asphalt & regs	X260
D-61	OP	solid	3/4		NR		grease	X259
D-62	OP	solid	1/2		NR		garbage & 5-gal oil can	X255
D-63	OP	solid	3/4		30-45		Garbage & grease	X254
D-64	OP	solid	1/4		0 HNU		oil & Grease ; brown	X259
D-65	OP	solid	1/4		120		Garbage & Grease	X252
D-66	G	—	—		—		Electrical conduit	—
D-67	OP	liquid	1/3		NR		black oils	X253
D-68	OP	liquid	2/3		10-20		black oils	X253
D-69	OP	liquid	1/4		10		black oils	X253
D-70	OP	solid	3/4		40-50		Garbage	—
D-71	OP	solid	1/4		50-60		Garbage & Grease	X252
D-72	OP	solid	3/4		12-15		Garbage & Grease	X252

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86 - 7/1/86</u>					DRUM SAMPLING			
CLIENT : <u>IEPA</u> WEATHER: _____					FIELD DATA SHEET			
JOB No. : <u>06369</u> AIR TEMP: _____								
SAMPLERS : <u>Moss/Kavanagh</u>								
DRUM I.D. #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	FOA/FNU READING (ppm)	PH / SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-73	OP	solid	2/3		2100		Garbage & Grease	X2C2
D-74	G	solid	F		11		black grease	X274
D-75	G	liquid	F		40 HNU		black oil	X275
D-76	OP	solid	1/2		12		oily Brlap	X2D2
D-77	-						see D8X	
D-78	OP	solid	1/8		25		brown grease	X278
D-79	OP	solid	3/4		85		garbage	-
D-80	OP	semifluid	1/2		9.5-15		oil sludge & regis	X2C5
D-81	G	solid	F		8.5		garbage	-
D-82	-						see D8Y	
D-83	OP	solid	1/2		8.5		grease	X283, X583
D-84	OP	solid	3/4		18		oily rupe	X294
D-85	OP	solid	1/8		8.5		brown grease	X285
D-86	OP	solid	3/4		45		Oil & Grease; Garbage	X2C7
D-87	OP	solid	1/10		8.5		Oil & Grease	X2C9
D-88	-						See D83A	
D-89	OP	solid	NR		9.5		Oil & Grease; Garbage	X2C8
D-90	OP	solid	1/4		8.5		brown grease	X270
D-91	G	solid	3/4		2 HNU		brown grease	X291
D-92	OP	solid	NR		9		Oil & Grease; Garbage	X2C8
D-93	OP	solid	F		7.6		brown grease	X293
D-94	OP	solid	7/8		9		Garbage	-
D-95	OP	solid	3/4		15		Oil & Grease	X2C9
D-96	OP	liquid/solid	1/2		9		Orange liquid; green	X296

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86 - 7/1/86</u> CLIENT : <u>IEPA</u> WEATHER: _____ JOB No. : <u>06369</u> AIR TEMP: _____ SAMPLERS : <u>Kavanagh/Moss</u>						DRUM SAMPLING FIELD DATA SHEET		
DRUM I.D. #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVA MINU READING (ppm)	PH / SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-97	OP	solid	3/4		8.6		Oil & Grease; Garbage	X2C7
D-98	OP	solid	1/10		9.5		Grease	X2D2
D-99	OP	solid	3/4		8.8		Garbage & Grease - brown	X2D2
D-100	OP						see D10X	
D-101	OP						see D101A	
D-102	OP	solid	3/4		150		mostly Garbage & Rags	X402
D-103	OP	liquid	1/2		9.6		gray liquid	X403
D-104	G	solid	1/3		17		black grease	X404, X505
D-105	G	-	E		9.5		E	E
D-106	OP	semifluid	F		17		black semifluid	X406
D-107	G	solid	NR		9.4		brown grease	X407, X507
D-108	OP	solid	F		9.8		brown grease	X408
D-109	OP	solid	3/4		9.5		brown grease & Garbage	X2D1
D-110	OP	solid	3/4		9.7		brown Grease	X2D1
D-111	OP	solid	3/4		17		Oil & Grease	X2C7
D-112	G	liquid	1/3		5 HNU		black oily liquid	X412
D-113	OP	-	E		10		E	E
D-114	OP	liquid	NR		4		black liquid; clear immiscible layer	X414
D-115	OP	solid	1/4		7		black grease	X415
D-116	G	liquid	F		2		black oil	X416
D-117	OP	liquid	F		2-3		black oil	X417
D-118	G	liquid	7/8		10-20 HNU		viscous black liquid	X418
D-119	G	liquid	F		3 HNU		black oil, clear liquid	X419
D-120	G	liquid	F		40 HNU		black oil	X420

PROJECT : <u>Lenz Oil</u> DATE : <u>6/23/86 - 7/1/86</u> CLIENT : <u>IEPA</u> WEATHER: _____ JOB No. : <u>06369</u> SAMPLERS : <u>Moss / Karenagh</u> AIR TEMP: _____						DRUM SAMPLING FIELD DATA SHEET		
DRUM I.D. #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVA HNU READING (ppm)	PH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-121	OP	solid	F	.	3.5		oil & Grease	X421
D-122	OP	liquid	NR		10-20 HNU		black liquid	X422
D-123	G	sem. fluid	F		3 HNU		black sludge / oil	X423
D-124	OP	solid	F		4.8		black tar	X424
D-125	G	solid	3/4		20-40 HNU		black tar	X425
D-126	G	solid	F		2.8		black grease	X426
D-127	G	sem. fluid, liquid	F		3.8		black sludge, clear liquid	X427T, X427B
D-128	OP	-	E		3-5		E	-
D-129	OP	-	E		2.8		E	-
D-130	OP	-	E		-		E	-
D-131	OP	-	E		6-2		E	-
D-132	-	-	E		-		E	-
D-133	-	liquid	1/6		5 HNU		oil & clear liquid	X433
D-134	G	liquid	< 1/2		5 HNU		black viscous fluid	X434
D-135	G	sem. fluid, liquid	1/4		0 HNU		brown metallic, clear inner layer	X435
D-136	G	-	E		-		E	-
D-137	G	liquid	1/2		10		clear-brown film on top	X437
D-138	G	-	E		-		E	-
D-139	G	-	E		-		E	-
D-140	G	-	E		-		E	-
D-141	G	-	E		-		E	-
D-142	G	liquid	1/10		NR		brown oil	X442
D-143	G	solid	1/2		-		ash	-
D-144	destroyed	solid	E		-		garbage	-

PROJECT : <u>Lenz O.I</u> CLIENT : <u>IEPA</u> JOB No. : <u>06369</u> SAMPLERS : <u>Kavanagh/Moss</u>						DATE : <u>6/23/86-7/1/86</u> WEATHER: _____ AIR TEMP: _____		DRUM SAMPLING FIELD DATA SHEET	
DRUM I.D. #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVA (HNU) READING (ppm)	PH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS	
D-145	G	solid	1/2		—		dsh	—	
D-146	G	solid	—	30 gal	—		bagged garbage	—	
D-147	G	liquid	F		NR		polyester resins	—	
D-148	G	liquid	F		NR			—	
D-149	G	liquid	F		NR			—	
D-150	G	liquid	F		NR			—	
D-151	G	liquid	F		NR			—	
D-152	G	liquid	F		NR			—	
D-153	G	—	E		—		E	—	
D-154	G	liquid	1/4		0 HNU		clear liquid with oil film	X 454	
D-155	G	—	E		—		E	—	
D-156	G	liquid	1/2		0 HNU		clear liquid	X 456	
D-157	G	—	E		—		E	—	
D-158	G	—	E		—		E	—	
D-159	G	—	E		—		E	—	
D-160	G	liquid	—	2 gal - before sample	NR		oil	X 460	
D-161	G	—	E		—		E	—	
D-162	G	—	E		—		E	—	
D-163	G	liquid	—	2 gal - before sample	NR		—	X 463	
D-164	G	—	E		—		E	—	
D-165	G	—	E		—		E	—	
D-166	G	—	E		—		E	—	
D-167	G	—	E		—		E	—	
D-168	G	—	E		—		E	—	

PROJECT : <u>Lenz Oil</u>					DATE : <u>6/23/86 - 7/1/86</u>		DRUM SAMPLING FIELD DATA SHEET	
CLIENT : <u>IEPA</u>					WEATHER: _____			
JOB No. : <u>06369</u>					AIR TEMP: _____			
SAMPLERS : <u>Moss/Kovenzyh</u>								
DRUM ID #	DRUM CONDITION	PHYSICAL STATE OF WASTE	HEIGHT OF WASTE (IN)	WASTE VOLUME (GAL)	OVA / HNU READING (ppm)	pH SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
D-169	G	-	E		-		E	-
D-170	G	-	E		-			-
D-171	G	-	E		-			-
D-172	G	-	E		-			-
D-173	G	-	E		-			-
D-174	G	-	E		-			-
D-175	G	-	E		-			-
D-176	G	-	E		-			-
D-177	G	-	E		-			-
D-178	G	-	E		0			-
D-179	G	-	E		-			-
D-180	G	liquid	1/5	5 gal	0 HNU		black oily liquid	X480
D-181	G	solid	1/4		NR		grease	X481
D-182	G	-	E		-		E	-
D-183	G	-	E		-		E	-
D-184	G	-	E		-		E	-
D-185	G	-	E		-		E	-
D-186	fiber	solid	F		0 HNU		white powder	X486
D-187	fiber	solid	F		0		white powder	X485
D-188	fiber	solid	F		0		white powder	X485
D-189	G	liquid	1/4		NR		clear liquid	X487
D-190	G	-	E		-		E	-
D-191	G	-	E		-		E	-
D-192	G	-	E		-		E	-

PROJECT : Lenz Oil DATE : 6/23/86 - 7/1/80
 CLIENT : IEPA
 JOB No. : 06369 WEATHER: _____
 SAMPLERS : Kavanagh / Moss AIR TEMP: _____

DRUM SAMPLING
FIELD DATA SHEET

[illegible]

Field Borehole Log

CLIENT ILLINOIS EPA
PROJECT LENI2 OIL
SITE _____
LOCATION (LATITUDE) (LONGITUDE) BEARING _____
CONTRACTOR _____
METHOD SOIL 3 3/4" HOLLOW STEM AUGER
OF _____
BORING: ROCK _____

JOB NO. 06369 HOLE NO. SB1 SHEET NO. 1 OF 2
WEATHER WARM, RAINY INSPECTOR A. BLACKMER
TEMP. 70 °F STARTED 11:30 A.M. 7/25 1986
DIP _____ FINISHED 3:00 P.M. 7/25 1986

ELEVATIONS: DATUM _____
CASING DIAM. _____ DRILL PLATFORM _____
GROUND SURFACE _____
CORE DIAM. _____ WATER LEVELS _____

LOG LEGEND	SAMPLE CONDITION	SAMPLING METHOD	SHIPPING CONTAINER
- SILT	- SAND	- GOOD	- DISTURBED
- CLAY	- GRAVEL	- FAIR	- LOST
		A - SPLIT TUBE B - THIN WALL TUBE C - PISTON SAMPLER D - CORE BARREL	E - AUGER F - WASH G - TUBE H - SLOTTED SAMPLER I - GLASS JAR J - DISCARDED

LOG	DESCRIPTION: COLOR; CONSISTENCY DENSITY; TEXTURE; STRUCTURE; SHAPE AND SURFACE CONDITION OF GRAINS; ODOR; ETC.	ELEV. DEPTH	SAMPLE TYPE	NO.	SIZE (IN.)	RETD. (IN.)	BLOWS PER 6 INCH	NOTES: BORING; TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT; ETC.
FILL	0-7" BLACK (SILT)	1	AQ	SB	24	13	PUSH	DRY
	7-13" ? STEEP BLACK MAT- ERIAL WITH MINERAL ROCK FRAGMENTS	2		1			PUSH	OVA HOLE > 1000 PPM
	0-5" SAME AS 7-13" ABOVE	3					PUSH	
		4	AQ	2		5	PUSH	MOIST
FILL	0-5" MH GRAY BROWN SILT CLAY, SOFT, SMALL ROCK FRAGMENTS, BLACK STAIN- ING	5					PUSH	OVA HOLE > 1000 PPM
	0-1" SM-ML BLACK POORLY SORTED SILTY-CLAYEY SAND	6					PUSH	WATER TABLE AT 4 FT.
	1-2" ROCK FRAGMENT IN FILL OF SPOON	7	AQ	3		8	PUSH	SATURATED OVA B.Z. = 0.1 PPM
	0-2" ROCK FRAGMENTS WITH BLACK FLUID, 2-8" ML BLACK TO DARK BROWN SILTY CLAY WITH ROCK FRAGMENTS, 8-16" SC	8					PUSH	OVA HOLE > 1000 PPM
FILL	0-13" ML MEDIUM GRAY, WELL SORTED CLAY-SILT, STEEP, SATURATED, NO OBVIOUS OIL STAINING, NO LAYERING	9					PUSH	LIQUID IN SPOON HEAVY, BLACK, VISCIOUS FLUID WITH TAR-LIKE PIECES
	0-12" OL MED TO DARK GRAY SILT CLAY WITH ROOT FRAGMENTS	10					PUSH	OVA HOLE > 1000 PPM
	GRAY BROWN GRAY TO BROWN SILT CLAY WITH MINERAL	11	AQ	4		2	PUSH	MEDIUM BROWN SILTY CLAY WITH SOME SMALL FINE GRAVELS & ROCK FRAGMENTS
		12					PUSH	POT UPPER 2" IN SAMPLE: X11 FOR WORST CASE ANALYSIS
LACUSTINE	0-12" OL MED TO DARK GRAY SILT CLAY WITH ROOT FRAGMENTS	13					PUSH	13-15" FRACTURED LIMESTONE FRAGMENTS
	GRAY BROWN GRAY TO BROWN SILT CLAY WITH MINERAL	14	AQ	5		16	PUSH	COLLECT SAMPLE: X12
		15					PUSH	
		16					PUSH	ROCK FRAGMENT 12-8" ML GRAY SILT; 13-20" ROCK FRAGMENTS
		17					PUSH	NO OBVIOUS STAINING; ADD TO SAMPLE X12

Field Borehole Log

CLIENT ILLINOIS E.F.A.
PROJECT LEAD OIL
SITE _____
LOCATION _____ BEARING _____
CONTRACTOR _____
METHOD SOIL 3 3/4 INCH HOLLOW STEM AUGER
OF _____
BORING: ROCK _____

JOB NO. 06369 HOLE NO. SB2 SHEET NO. 1 OF 1
WEATHER FAIRLY WARM INSPECTOR A. G. F. F. F.
TEMP. 70 °F STARTED 7:00 A.M. 7/25 1986
DIP _____ FINISHED 10:00 A.M. 7/25 1986
ELEVATIONS: DATUM _____
CASING DIAM. _____ DRILL PLATFORM _____
GROUND SURFACE _____
CORE DIAM. _____ WATER LEVELS _____

LOG LEGEND	SAMPLE CONDITION	SAMPLING METHOD	SHIPPING CONTAINER
- SILT	- GOOD	A - SPLIT TUBE	N - INSERT
- SAND	- DISTURBED	B - THIN WALL TUBE	O - TUBE
- CLAY	- FAIR	C - PISTON SAMPLER	P - WATER CONTENT TIN
- GRAVEL	- LOST	D - CORE BARREL	Q - GLASS JAR
			R - CLOTH BAG
			S - PLIOFILM BAG
			T - CORE BOX
			Z - DISCARDED

LOG	DESCRIPTION: COLOR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOUR, ETC.	ELEV. DEPTH	SAMPLE TYPE	NO.	SIZE (IN.)	RETD. (IN.)	BLOWS PER 6 INCH	NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC.
FILL	0-18" [GW] BLACK COARSE SAND TO FINE GRAVEL SIZE MATERIAL (INDERS (?); 18"-24" LIGHT GRAY WEATHERED-IT'S STICKY (?)	1	AQ	5	24	24	PUSH	DATA = 500 PPM
				B			PUSH	DAMP
				2			PUSH	
FILL	0-8" [?] WHITE FRAGMENTS, VERY SLIGHT BLACK MATRIX	2	AQ	2		16	41	OVA HOLE > 1000; OVA B.Z. = 0-1 PPM
							29	LIQUID OVA JAR = 500 PPM
							22	
TIU(?)	3-16" [ML] DARK BROWN MOIST MATERIAL, SANDY, VERY BLACK	3	AQ	3		18	40	OVA HOLE >> 1000 PPM; OVA JAR = 100 PPM
	0-18" [ML] BLACK, VERY STIFF MATERIAL WITH ROCK FRAGMENTS	4	AQ	4		9	45	
	MATRIX SILTY/CLAY; LOOKS LIKE OIL STAINED TILL	5	AQ	5		9	45	COLLECT WORST CASE SAMPLE: X109
TILL	0-9" [O/ML] DARK BROWN, MODERATELY SOFT SILTY/CLAY TILL?	6	AQ	6		9	7	OVA HOLE >> 1000 PPM; B.Z. = 0-1 PPM
	TOP PORTION LOOKS OIL STAINED	7	AQ	7		9	9	FILL(?)
	BREAK RE. ROCK OR BLACK FRAGMENT	8	AQ	8		9	7	
	NO RECOVERY, DRILLER MIGHT HE MAY HAVE BEEN PUSHING PEBBLE	9	A	5		NO RECOVERY	5	OVA HOLE > 1000; B.Z. = 3 PPM
		10	AQ	6		4	3	
	0-4" [MH] DARK BROWN, SILTY, VERY SOFT - VERY SOFT	11	AQ	7		14	3	OVA B.Z. = 0 PEAKING AT 4 PPM
	0-5" [MH] SAME AS ABOVE	12	AQ	7		14	3	REFUSAL AT 1000; JAMESON (?)
	5-13" [SM] LIGHT BROWN, LAMINATED FINE SAND AND SILT BEDS	13	AQ	7		14	4	FRAGMENTS IN SPOON
	VERY THIN LAMINAE, NO OBVIOUS STRUCTURE, MOIST						5	SAMPLE COLLECTED FOR CHEMICAL ANALYSIS: X110

CLIENT ILLINOIS EPA
PROJECT LELIT OIL
SITE _____
LOCATION (LATITUDE) (LONGITUDE) BEARING _____
CONTRACTOR CALDWELL CONSTRUCTION
METHOD SOIL 6.25 HOLLOW STEM DRILL
OF _____
BORING: ROCK 1X 1/2" DIA. DRILL OVER DRILL
TO 4" W/ 3/8" PAPER BIT

JOB NO. 06369 HOLE NO. 583 / L106 SHEET NO. 1 OF 2
WEATHER HOT, HUMID INSPECTOR A. BLACKMER
TEMP. ~90 °F STARTED 11:00 A.M. 7/16 1986
DIP _____ FINISHED 9:30 A.M. 7/18 1986
ELEVATIONS: DATUM _____
CASING DIAM. _____ DRILL PLATFORM _____
GROUND SURFACE _____
CORE DIAM. _____ WATER LEVELS _____

LOG LEGEND	SAMPLE CONDITION	SAMPLING METHOD	SHIPPING CONTAINER
- SILT	□ - SAND	□ - GOOD	□ - DISTURBED
- CLAY	□ - GRAVEL	□ - FAIR	□ - LOST

LOG	DESCRIPTION: COLOR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS; ODOR, ETC.	ELEV. - DEPTH	SAMPLE TYPE	NO.	SIZE (IN.)	RETD. (IN.)	BLOWS PER 6 INCH	NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC.
	0-11" GP POORLY SORTED FINE SAND TO FINE GRAVEL; FRAGMENTS ARE SUBANGULAR; BOTTOM 2" MOIST	1	AQ	5	24	11	10	OVA HOLE > 1000 PPM, OVA JAR 400 PPM
		2		3			9	NO PICTURE, DROPPED CAMERA
		3		1			9	
	0-3" GP SAME AS ABOVE: SATURATED; 3-7" ML DARK BROWN CLAY SILT, STIFF, MOIST; 7-12" SANDY DIOMITE ROCK FRAGMENTS	4	AQ	5		12	28	OVA HOLE > 1000 PPM, BREAKING ZONE
		5		3			14	1 PPM, SAMPLE JAR = 160 PPM
		6		2			14	
	0-19" ML GRAY TO YELLOW - BROWN, MOTTLED, SILT WITH SOME CLAY; SUB-ANGULAR SMALL TO MED ROCKS, 19" ROCK FRAGMENTS	7	AQ	3		19	13	OVA HOLE > 1000, B.Z. = 1 PPM
		8					19	FLUID IN SPON, SILT IS
		9					43	MOIST, NO OBVIOUS STAINING
		10					26	
	0-3" ML YELLOW - BROWN SILT WITH ROCK FRAGMENTS	11	AQ	4		15	16	OVA B.Z. = 1 PPM; OVA JAR = 400
		12					38	PEBBLES, SHARP CONTACT BETWEEN
	3-15" ML GRAY SILT WITH ROCK FRAGMENTS, SUBROUNDED	13					29	YELLOW - BROWN AND GRAY SILTS; NO
		14					35	VISIBLE STAINING - RAMP
	0-14" ML GRAY SILT WITH LARGE WEATHERED, HIGHLY FRAGMENTED COARSE, OBVIOUS OIL STAINING, MOIST	15	AQ	5		14	24	BLACK OILY LIQUID MIXED WITH
		16					20	WATER DRAINED FROM SPON
		17					27	OVA HOLE > 1000, B.Z. = 5-8 PPM
		18					31	OVA JAR > 1000
	0-3" ML GRAY SILT WITH ROCK FRAGMENTS; 3-9" DARK GRAY ROCK FRAGMENTS; 9-17" DIOMITE (?) ROCK FRAGMENTS	19	AQ	6		17	46	OVA HOLE > 1000 PPM; OVA JAR = 240
		20					18	SOME SILT; MOIST; NO OBVIOUS
		21					25	STAINING; OILY PHASE AP-
		22					33	PARENT IN AUSTRO-CUTTINGS
	0-4" ROCK FRAGMENTS WITH SOME SILT; SAMPLE MOIST	23	AQ	7		4"	46	OVA JAR = 120 PPM, B.Z. = 8 PPM
	REFUSAL => BEDROCK(?)	24					100	
		25					3 INCH	

BE ROCK (?)



JOB NO. 0369 HOLE NO. SB3 / L106 SHEET NO. 2 OF 2

JOB NO. 06369 HOLE NO. 583/ SHEET NO 2 OF 2

DEPTH (FEET)	REMARKS	RECOVERY (%)	NOTES
0.0 - 6.1	ROCK CORING AT LIDG. LCA-TION ~ 30 FEET SE 3		
6.1 - 11.4	REFUSAL HIT AT 6.1 FT. BELOW SEAM SURFACE. START CORING AT 6.1 FEET.		
6.1 - 8.1	FIRST RUN: 5.3' (6.1' TO 11.4')		
8.1 - 11.4	6.1' TO 8.1' COMPETENT LIMESTONE (?), ONE SUBVERTICAL JOINT WITH IRON STAINING; TWO HORIZONTAL CRACKS, FRACTURE (?), COLOR GRAY; UNWEATHERED.	100% RECOVERY	DURING RE-EL. OR DOWN THE HOLE UNKNOWN BECAUSE SAMPLE BROKEN
11.4 - 11.8	8.1' TO 11.4' NO RECOVERY EXCEPT FOR A FEW LARGE PEBBLES. PEBBLES ARE ROUNDED BUT SOURCE OF ROUNDING NOT KNOWN, COULD BE DUE TO TRANSPORT OR CORING PROCESS.	1-2% RECOVERY	DURING CORING RATE INCREASED DRAMATICALLY, 10% WATER LOSS
11.8 - 16.5	ROCK HIT AGAIN AT 11.8'. SECOND RUN 4.7' (11.8' TO 16.5'). 11.8' - 16.5' HIGHLY FRACTURED; PIECES RANGE IN LENGTH FROM APPROX. 4" TO FINE GRAVEL SIZE FRAGMENTS. MATERIAL APPEARS TO BE IRGILLACEOUS LIMESTONE, DOLMITE (?), LIGHT GRAY.	~60% RECOVERY	BLACK STAINING ON MANY FRACTURE SURFACES. ONE OBVIOUS SUBVERTICAL FRACTURE AT 15' B.G.S. STAINED BLACK. BLACK MINERALIZATION WITHIN ROCK (NODULES ~ 0.1" IN DIAM). OVA OF CORE = 0 PPM
16.5 - 17.0	END OF BORING		

CLIENT IEPA
PROJECT LENR OIL, LEMONT ILLINOIS
SITE
LOCATION BEARING
CONTRACTOR LANOIE DRILLING
METHOD OF BORING SOIL 6.25 INCH I.D. HOLLOW STEM
ROCK 1.75 INCH I.D. BEAM IN 3 7/8"

JOB NO. 06369 HOLE NO. 564 SHEET NO. 1 OF 3
WEATHER HOT, HUMID INSPECTOR A. BLACKMER
TEMP 90 °F STARTED 6:00 A.M. 7/29 1986
DIP FINISHED 9:00 A.M. 7/21 1986
ELEVATIONS: DATUM
CASING DIAM. 6 I.D. DRILL PLATFORM
GROUND SURFACE
CORE DIAM. 1.75 WATER LEVELS

LOG LEGEND	* SAMPLE CONDITION	** SAMPLING METHOD	** SHIPPING CONTAINER
- SILT	- SAND	- GOOD	- DISTURBED
- CLAY	- GRAVEL	- FAIR	- LOST
		A - SPLIT TUBE	E - AUGER
		B - THIN WALL TUBE	F - WASH
		C - PISTON SAMPLER	K - SLOTTED SAMPLER
		D - CORE BARREL	
			N - INSERT
			O - TUBE
			P - WATER CONTENT TIN
			Q - GLASS JAR
			R - CLOTH BAG
			S - PLOFILM BAG
			T - CORE BOX
			Z - DISCARDED

LOG	DESCRIPTION: COLOR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOR, ETC.	ELEV. - DEPTH	* TYPE	NO.	SIZE (IN.)	RETD. (IN.)	BLOWS PER INCH	NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC.
	0-6" SM BROWN SILTY SAND		AQ	4	24	10	36	
	6-8" SM BLACK SILTY SAND	10		1			FOR	
	8-10" PEA GRAVEL WITH SILT						1.5 FT	WHITE
	0-10" ML BROWN - GRAY SILT	20	AQ	4		10	34	OVA SPAN = 0 PPM, OVA AT 1" = 71000
	10-12" CLAY WITH PEBBLES			2				NO OBVIOUS OIL STAINING
	DRY, VERY STIFF	30						PICTURE (P) #18
	0-5" ML SAME AS ABOVE		AQ	4		4	PUSHED	
		40		3				
	0-11" ML DARK BROWN SILT	50	AQ	4		11	PUSHED	P=19
	CLAY, MEDIUM, STIFF			4			PUSHED	OVA AT HOLE > 1000 PPM, OVA B.Z. = 30-
	WOOD FRAGMENTS (FILL?)	60		4			22	40 PPM, OVA JAR SAMPLE > 1000
	0-6" ML GRAY (LAY) SILT		AQ	4		6		OVA HOLE 21000, OVA JAR = 600
	NO PEBBLES, PIECE OF WOOD	70		5			31	NO OBVIOUS OIL STAINING
	AT BOTTOM OF SPOON, STIFF							P=21
	0-2" ML POORLY SORTED	80	AQ	4		2	30	OVA HOLE > 1000, OVA JAR > 1000
	SILT/CLAY WITH PEBBLES FINE			6				BLACK LIQUID OIL STAINING
	CRACKED, MEDIUM	90						OF WATER
	0-3" ML SANDY BROWN SILTY CLAY		AQ	4		8	48	OVA HOLE > 1000, OVA SPAN = 40, B.Z. = 30 PPM. LIQUID IN SEPARATE INTO
	TOP SOIL (?)	100		7				MED BROWN LIQUID AND BLACK LIQUID, PUT
	3-8" GRAY PEBBLES WITH PIECE OF WOOD			8				IN COMPOSITE SAMPLE
			AQ	4		4	60	OVA HOLE > 1000, OVA JAR > 1000 P=24
	0-1" GRAY SILTY CLAY			8				LIQUID MED. BROWN TO BLACK
	WITH PEBBLES	120						P=25
	0-4" ML GRAY SILTY CLAY			9		10	57	OVA HOLE > 1000, OVA JAR = 100 PPM
	4-10" DOLOMITE ROCK FRAGMENT	130	AQ					NO OBVIOUS STAINING OR ROCK FRAGMENTS
	5-6" ROCK (?)							

Field Borehole Log

JOB NO. 06369 HOLE NO. SB4 SHEET NO. 2 OF 3

0-8" ROCK FRAGMENTS	14	X	AQ	4	8	82	OVA HOLE = 700 OVA SWN = 80 P=0
	15	X	AQ	4			1100 OBVIOUS STAINING ON R. K
0-2" ROCK FRAGMENTS	16	X	AQ	4	Z	112	OVA HOLE 7000 OVA SWN 700 P=07
REFUSAL				1			LIQUID FROM SPON. T. L. A. F. R. K.
							OVA JAR = 540
ROCK GRINDING :			SET CASTING				
FIRST RUN 5.4' (17.5-22.9)	17.5						OVA HOLE 71000 PAM
80% RECOVERY	18						OVA BREAKING 2 P. K. = 2011M
GRAY LITESTONE WITH	19						PEAKING TO 52 PPM
ARGILLACEOUS PARTIALS	20		80% RECOVERY				NO OBVIOUS OIL STAINING
HIGHLY FRACTURED	21						ROCK. ROCK STAINED
LONGEST SOLID PIECE	22						RUSTY ORANGE CE. FIVE
6" FRAGMENTS REMN.	23						LEFT IN CORE BATH L
INSIDE FROM FINE	24						OPENING (7)
GRAVEL TO 2" LONG	25						100% WATER LOSS
17.5-20.0' SURFACE OF	26						
CORE AND FRAGMENTS	27						
REDDED (1.5-1.5' (1.5'))	28						
20-21' 4" HORIZONTALS	29						
1.5-2.0' 1.5' FOOT BLACK	30						
SILICA	31						
21-22.9' (rock fragments)	32						
	33						
SECOND RUN 5.7' (22.9-28.6)	34						
80% RECOVERY	35						
22.9-23.4 SAME AS ABOVE	36						OVA HOLE = 200 PPM
23.4-26.2 4" PIECES	37						NO OBVIOUS OIL STAINING
3 EVENLY SPACED HORIZ.	38						100% WATER LOSS
CENTRAL PARTIALS STAINED	39						BREAKING ZONE = 1 PPM
BLACK	40						ROUGH WITH BLACK STAINING
26.2-27.0 HIGHLY FRACTURED	41						ITATION (LARGE)
PIECES BATH FROM 0.5-3.0'	42						BLACK HORIZONTAL FRACTURE
~0.5 INCH DIAM. BLACK NODULE	43						WITH WHITE NODULE
IN ROCK 22-28.6 SOLID	44						~0.3 INCH DIAM.
CORE BROKEN IN 4 PIECES	45						
ALONG SLIGHTLY INCLINED FRACT.	46						
URES. 1 FRACTURE SMOOTH AND	47						
PLANAR, NO STAINING	48						
OVER FRACTURES	49						



12105

JOB NO. 06369 HOLE NO. SB4 SHEET NO 3 OF 3

[illegible]



JOB NO. 06369 HOLE NO. SB5 SHEET NO. 1 OF 1

JOB NO. 06369 HOLE NO. SB5 SHEET NO. 1 OF 1

[illegible]

APPENDIX C

Well Construction Logs

WELL CONSTRUCTION DESIGN

Job: 06364

Date: 7/16/86

Well Number: L1055

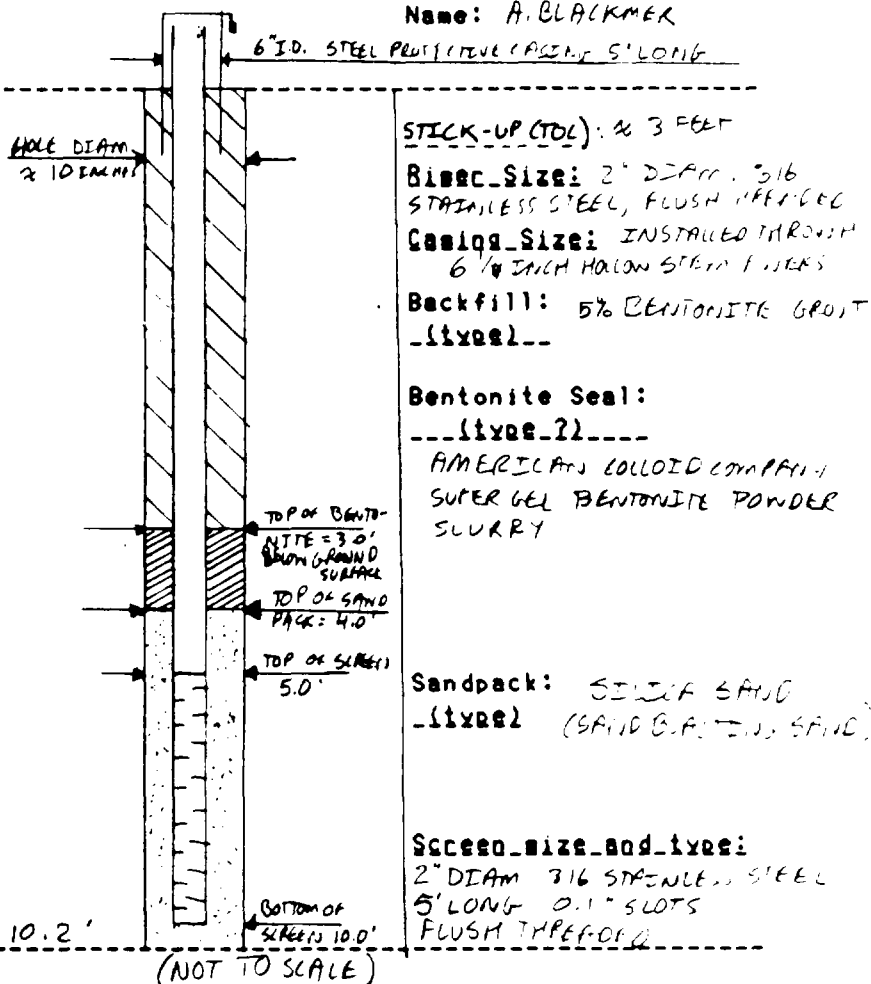
Time taken to install: 2.5 hrs

Name: A. BLACKMER

Ground Surface

General Geologic Log

REFER TO SB4 LOG



Questions: How were annular materials emplaced?
SAND PACK FORCED INTO ANNULAR SPACE; BENTONITE SEAL AND GROUTED TIGHTENED

How were depths to materials measured?

CHECKED WITH TAPE AND WEIGHT

How developed?

AIR LIFT

What parameters were measured?

- PARAMETERS MEASURED DURING PURGE FOR SAMPLING

- RELATIVE TURBIDITY DURING DEVELOPMENT

Drilling and Installation Chronology:

REFER TO CHRONOLOGY OF L1055 AND L105D

How long?

4 HOURS

Comments and Problems:

NO PROBLEMS ENCOUNTERED

WELL CONSTRUCTION DESIGN

Job: C6369

Well Number: L105D

Date: 7/21/86

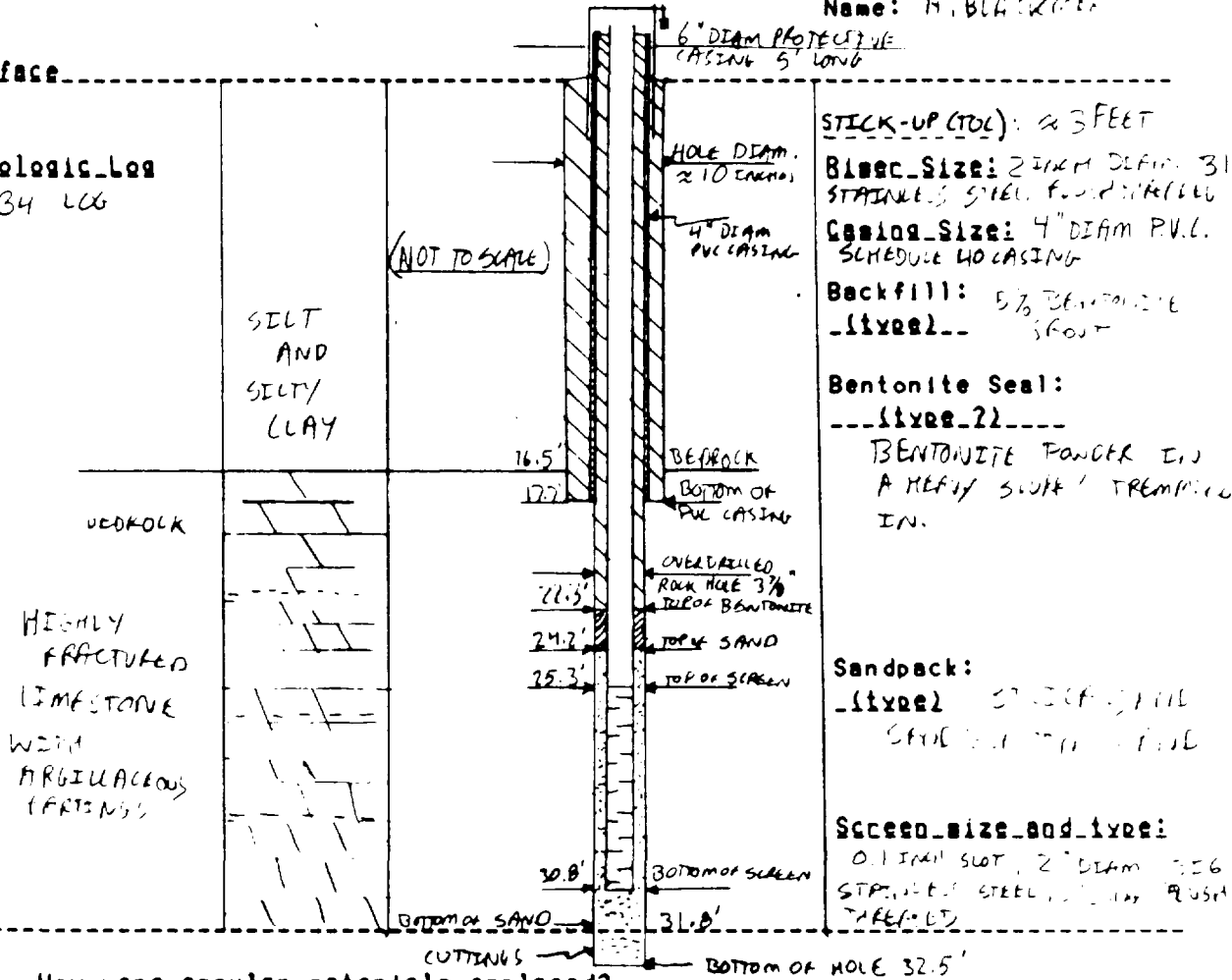
Time taken to install: 4.5

Name: R. BLACKMAN

Ground Surface

Geological Log

REFER TO SB4 LOG



- Questions:**
- How were annular materials emplaced?
SAND PACK PAVED THROUGH FUNNEL DRY, BENTONITE SEM AND FROM TREMPED
 - How were depths to materials measured?
CHECKED WITH TAPE AND WEIGHT
 - How developed?
AIR LIFT
 - What parameters were measured?
- PARAMETERS MEASURED DURING PURGE FOR SAMPLING
- RELATIVE TURBIDITY DURING DEVELOPMENT
- Occasions and Installation Geology:**
- REFER TO CHRONOLOGY OF L1055, L105D AND SB4

How long?

4 HOURS

Comments and Problems:

HAD PROBLEMS FLUSHING CUTTINGS BECAUSE OF LOSS OF CIRCULATION WHEN DRILLING FRACTURES. SOLUTION: OVERPAILED HOLE LET CUTTINGS ACCUMULATE IN SUMP, INSTALLED SAND PACK ON TOP OF CUTTINGS

WELL CONSTRUCTION DESIGN

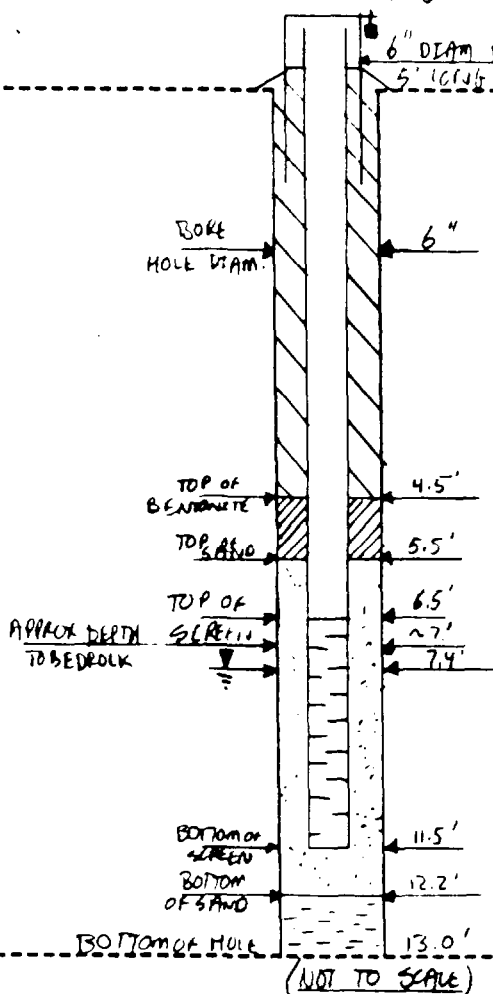
Job: 06369
Well Number: L1065

Date: 7/23/86
Time taken to install: 2 1/2
Name: A. L. F. F. F.

Ground Surface

General Geologic Log

Refer to log SB3



STICK-UP (TOL): 25.5'

Line Size: 2 INCH DIAM 316 STAINLESS STEEL, FLUSH THREADED

Casing Size: BORE HOLE DRILLED WITH 5 7/8 INCH TAPERED BIT

Backfill: 5% BENTONITE SEAL

Bentonite Seal:

5% BENTONITE SEAL

1/2 INCH DIAMETER TAPERED L PELLETS

Sandpack: SILICA SAND

5% BENTONITE SEAL

Screen size and type:

0.1 SLOT 2 INCH DIAM, 316 STAINLESS STEEL, 5' LONG, FLUSH THREADED

- Questions:
- How were annular materials emplaced?
SAND PACK AND BENTONITE PELLETS DRY POURED, GRout TREMMIED
 - How were depths to materials measured?
TAPE AND WEIGHT
 - How developed?
AIR LIFT
 - What parameters were measured?
- PARAMETERS MEASURED DURING PULSE AIR SAMPLING
- RELATIVE TURBIDITY DURING DEVELOPMENT

Drilling and Installation Chronology:

Refer to CHRONOLOGY OF L106 AND SB3

Comments and Problems:

NO PROBLEMS ENCOUNTERED

How long?

5 HOURS

WELL CONSTRUCTION DESIGN

NOT COMPLETED

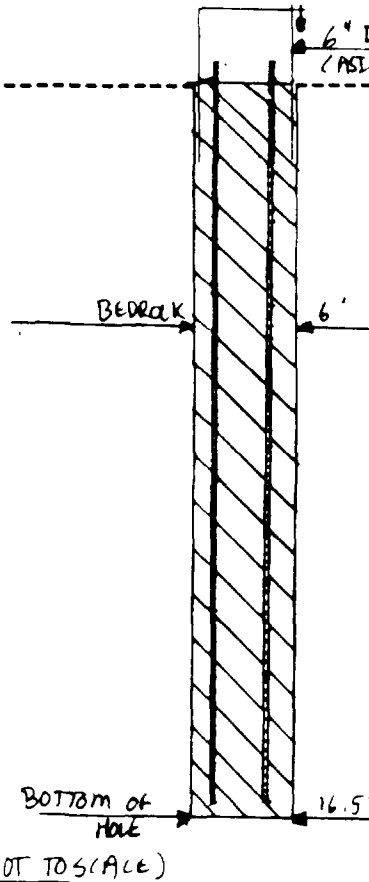
Job: 06369
Well Number: L106D

Date: 7/21/86
Time taken to install:
Name: A. BLACKMER

Ground Surface

General Geologic Log

REFER TO LOG FOR GAB3/L106



STICK-UP (TO):

Block Size:

Casing Size: 4" PYC CASING

Backfill:
---(type)--- ~5% BENTONITE
GROUT

Bentonite Seal:
---(type?)---

Sandpack:
---(type)---

Screen size and type:

Questions: How were annular materials emplaced?

How were depths to materials measured?

How developed?

How long?

What parameters were measured?

Drilling and Installation Chronology:

Comments and Problems:

WELL NEVER COMPLETED

APPENDIX D

Tank Sampling Data Sheets

PROJECT : Lenz civil DATE : 6/22/00 - 6/30/00
 CLIENT : IEPA
 JOB No. : 06369 WEATHER: _____
 SAMPLERS : Matrasian / Hazen / Petrisko AIR TEMP: _____

TANK SAMPLE
FIELD DATA SHEET

TANK ID #	TANK CONDITION	PHYSICAL STATE OF WASTE	TANK DIAMETER (FT.)	HEIGHT OF WASTE (FT.)	VOLUME OF WASTE (GAL)	(OVA)/HNU READING (ppm)	pH / SPECIFIC CONDUCTIVITY	SAMPLE APPEARANCE	COMMENTS
T-1	Good	-	4.5	Trace		NR			-
T-2	Good	-	5	E		NR			-
T-3	Good	-	Tank Truck	E		NR			-
T-4	Good	-	3	E		0			-
T-5	Good	liquid	8	1.2		300-400			X 315
T-6	Good	liquid	8	6.5		10-15			X 306
T-7	Good	liquid	7.5	4.6		30-40			X 307
T-8	Good	liquid	7	2.7		20-25			X 308
T-9	Good	liquid	8.5	7.4		300			X 309
T-10	Good	liquid	10	3.6		<1			X 310
T-11	Good	liquid	7	4.9		10			X 311
T-12	Good	liquid	8.5	2.2		200-400			X 312
T-13	Good	liquid	8	2		20-40			X 313
T-14	Good	liquid	NR	NR		NR			X 314
T-15	Good	liquid	6.5	0.5		10-15			X 315
T-16	Underground	liquid	45 x 29	5.8		1-2			X 316
T-17	Underground		unknown	NR		NR			-
T-18	Underground	liquid	50 x 30	0		71000			X 317
T-19	Good		Tank Truck	Trace		NR			-
T-20	Good		Tank Truck	Trace		NR			-
T-21	Good		Tank Truck	Trace		2			-
T-22	Good		Tank Truck	0.5		8			
T-23	Good	liquid		4.3		300			X 318
T-24	Good	liquid		1.2		100			X 319

[illegible]